Battelle
Columbus Laboratories

Project Number 269-1216 (199)

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Date July 17, 1980

To Dr. E. W. Ungar

From D. A. McKown DA McKown by EWU

Subject Radiological Safety
Quarter Ending June 30, 1980

This report concerns the highlights of radiological safety at BCL, as observed by the RSO.

A. Radiological Incidents and Items of Noncompliance

One is recorded at the West Jefferson Hot Laboratory in the Quarter.

Index Number NI-2-5/5/80

On May 2, 1980, Hot Laboratory personnel were unloading a cask containing failed fuel from Connecticut Yankee. On removal of the cask lid, a large quantity of black substance dispersed throughout the pool water. Shortly thereafter, radiation exposure rates around the pool were noted increasing and contamination was detected at elevated levels on previously clean surfaces. The unloading was being conducted according to facility operating procedures, which did not call for the use of respirators in this phase. The operation was halted for consultation and donning respirators.

Subsequent bioassay procedures, including in-vivo counting and dosimeter evaluations, established that pulmonary depositions were a small fraction of allowable body burden and whole body dose was well below limits prescribed in 10 CFR Part 20.

The occurrence resulted in extensive contamination of the section of the facility adjacent to the pool. Isolation and clean up activities were immediately initiated.

On May 19 an attempt was made to remove a spacer from the cask cavity. This activity dislodged additional contamination which recontaminated areas adjacent to the pool at a somewhat lower level than the initial occurrence. Decontamination is continuing.

W. Madia, Harley Toy and I have concluded, the occurrence is reportable to NRC as a Part 21 defect, in that it "could have constituted a substantial safety hazard". BCL internal reporting procedures, including informing the BCL responsible officer, Dr. F. J. Milford, has been completed. Harley Toy and I are completing a written report to NRC for Dr. Milford's signature, as required by regulation.

A. Radiological Incidents and Items of Noncompliance(Continued)

I requested an ad hoc committee, composed mainly of RSC committee members, to determine as much as possible the mechanism of release in this occurrence. The report from the ad hoc committee is included in the BCL internal documentation package of the occurrence. One of the conclusions of the ad hoc committee was the decay heat, computed by the Sponsor, of the fuel assembly was low by a factor of 0.8.

B. Observations

Receipt and use of 100 milliCuries of individual radio nuclides and 1 kilogram of depleted uranium was approved for researchers at King Avenue.

C. Operations Radiological Safety and Health Physics

The decontamination of the old radiochemistry facility in Building 4 has been temporarily suspended to permit the workers to remodel the old powder metalurgy facility, 3002 in Building 3. Health Physics Services of Section 588 are providing health physics support for both operations.

D. Recommendations

I have recommended:

1. Department 520 arrange for a small fenced enclosure on the porch of Building 7 for the storage of low level radioactive waste packed in steel drums awaiting shipment for disposal.

2. Department 640 erect a barrier around a 2-hi mill and forging hammer that are thoroughly contaminated with uranium in Building 2. Signs indicating contamination should be placed at the barrier, or on the equipment, to warn persons in the unrestricted area.

3. Department 760 explore the options of enclosing two pieces of equipment: a die casting machine in the foundry and a furnace on the open bay area of the second floor of Building 3. The furnace is used occasionally for casting depleted uranium, and the die caster for die casting depleted uranium. Both pieces of equipment are in open unrestricted areas accessible to anyone in the Institute.

4. Section 585 of Department 580 present operating procedures containing radiological safety provisions to the cognizant RSC subcommittees for review and recommendation for approval, as "approved standard procedures", as provided for in the RSC charter.

DAM:jf
7-21-80

For Review and Approval

No. G5012-0107

Name	Initials	Date
Originator J. W. Ray		7/10
Concurrence		
Approved		

Internal Distribution

D. Lozier
V. Pasupathi
H. Toy
J. W. Ray
Project Records

July 10, 1990

Mr. J. O. Neff
Project Manager, BCLDP
U.S. Department of Energy
Chicago Operations Office
505 King Avenue
Columbus, Ohio 43201

Dear Mr. Neff:

Enclosed is a copy of our formal reporting letter to the Nuclear Regulatory Commission regarding a release of contamination within the Hot Cell Laboratory of May 18, 1980. This is provided in response to your request to Harley Toy last month.

Sincerely,

Joseph W. Ray
Group Vice President and
General Manager
D&D Operations

JWR:jv

Enclosure

July 18, 1980

Mr. James G. Keppler, Director
Office of Inspection and Enforcement
Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

Docket 70-8; 10 CFR Part 21 Report

This letter constitutes formal reporting of a defect as stipulated in 10 CFR Part 21. This formal submission follows up our initial telephone notification to your Mr. Charles Peck on the morning of July 17, 1980. Mr. Harley L. Toy, BCL Licensing Coordinator and my First Delegated Alternate, conducted the initial notification.

This formal notification is presented as outlined in Section 21.21(b)(3) of 10 CFR Part 21.

(i) Dr. Frederick J. Milford, Associate Director of Battelle's Columbus Laboratories and Designated Responsible Officer under provisions of 10 CFR Part 21, and Harley L. Toy, Licensing Coordinator and First Delegated Alternate.

(ii) The Battelle Columbus Hot Cell Laboratory operated under Byproduct License No. 34-6854-05 and Special Nuclear Materials License No. SNM-7.

(iii) Not applicable.

(iv) A release of airborne radioactive material and subsequent surface contamination occurred at the Battelle Columbus Hot Cell Laboratory on May 3, 1980, during unloading operations of a failed spent fuel assembly received from the Connecticut Yankee Atomic Power Company.

There was no release of radioactive material from the building. The data from bioassay procedures, including in-vivo counting, have established that resultant radiation exposures were well within prescribed

standards as set forth in 10 CFR Part 20. Pulmonary depositions were a fraction of a percent of the permissible body burden.

An evaluation of this deviation in accordance with Part 21 procedures has determined that this incident is reportable to the NRC as a defect in that it could have created a substantial safety hazard. The determination that a substantial safety hazard could have resulted is based upon the following:

(a) Five staff members were in the immediate area of the pool when the release occurred,

(b) Established cask unloading procedures were followed which do not call for respiratory protection during that phase of the operation, and

(c) A significant radiological source term was present during the time they were unprotected.

(v) The results of the evaluation leading to the determination of a defect that could have constituted a substantial safety hazard were transmitted to the Designated Responsible Officer on July 16, 1980.

(vi) The exact kinetics and chemistry involved in this release are yet to be determined. Battelle-Columbus is in the process of proposing several research programs whose objectives are to provide a better understanding of the physical and chemical processes which occurred during the shipment of this failed spent fuel assembly. Pertinent to the release occurring during unloading operations at the BCL Hot Cell Laboratory are ongoing studies and investigations by Nuclear Assurance Corporation. Their spent fuel shipping cask NAC-1E was utilized in the shipment of the failed Connecticut Yankee fuel assembly to Columbus, Ohio. The shipment was accomplished with no adverse effects on the health and safety of the public during transport. Reference is made to a report filed by Connecticut Yankee Atomic Power Company to NRC's Region I on May 21, 1980. The letter report from Connecticut Yankee's W. G. Counsil stated that cask NAC-1E license decay heat limit had been violated during the shipment to Battelle-Columbus. The letter report was docketed in accordance with the provisions of 10 CFR Part 71 and DPR-61.

(vii) In order to preclude a reoccurrence of this type of incident, four corrective actions have been taken.

(1) The use of respiratory protection will be required during cask unloading procedures involving failed fuel assemblies until firm recommendations are made by the internal reviewers (see Item 2).

(2) A comprehensive review of all Hot Cell Laboratory Receiving Procedures will be conducted by D. G. Freas, Associate Section Manager, and the Radiological Materials Subcommittee. Recommendations regarding additional procedures needed, as well as modificaton of existing ones, will be submitted to the Radiological Safety Committee for approval. This review will be completed by July 31, 1980, and the recommendations implemented as soon as practical.

(3) Prior to submittal of case reviews to the Radiological Safety Committee (RSC), the 585 Section Manager will require review and approval of all cases by the Hot Cell Laboratory Operations Manager and his staff. This review will be oriented to the "hands-on" aspects of the proposed experiment. This procedure is to be in place by July 15, 1980.

(4) Communication with the shipper regarding potential hazards during unloading will be enhanced. Such communications are presently included in cask unloading procedures. Effective immediately, communication procedures will be initiated at the time of loading by the shipper and continued throughout the unloading operations.

(viii) It is anticipated that the results of our ongoing investigations into the cause of the release during cask unloading operations will be available for distribution to all shippers and processors of irradiated spent fuel. The information and conclusions drawn during our evaluation have been shared with Connecticut Yankee and it is our intention to continue this joint participation to a satisfactory conclusion.

We are confident that our corrective actions will preclude a reoccurrence of such an incident. Our total file pertaining to the investigation of the deviation and subsequent determination of a defect reportable under 10 CFR Part 21 is available for your inspection. We shall provide whatever additional information you may require.

Very truly yours,

Frederick J. Milford
Associate Director
(HLT)
FJM:lba

Enc. (3)

cc: Connecticut Yankee Atomic Power Company, Mr. Ralph Brisco

Registered Mail